Letter to the Editor

Early Polymerization of Histoacryl® with BD Plastipak® Syringes

B. NIEUWENHUIZEN, C. BEERSE-LUTE, R. VAN DEN BERG

Radiology Department, Academic Medical Center; Amsterdam, Netherlands

Key words: embolization, glue, polymerization

Histoacryl® (N-butyl-2-cyanacrylate) is widely used as an embolic agent for the treatment of arteriovenous malformations and arteriovenous fistula. The glue almost immediately polymerizes when the substance comes in contact with ionic fluids such as blood or with vascular endothelium. To allow a safe injection through a microcatheter the Histoacryl is mixed with ethiodized oils like Lipiodol Ultrafluide® (Guerbet, France). This makes the substance not only radiopaque, but also delays polymerization time and thus allows the interventionalist to modify the process of polymerization.

In our institution we routinely use Histoacryl® with Lipiodol Ultrafluide® as the embolic agent of choice for the treatment of brain arteriovenous malformations. Over the years, we have encountered recurrent problems in which the mixture of Histoacryl® and Lipiodol Ultrafluide® showed early polymerization, resulting in incomplete or even failed injection of the glue through the microcatheter. After another of these events we noticed that failure to inject glue was not only related to blockage of flow due to early polymerization in the microcatheter itself, but also to an increased resistance in moving the plunger of the BD Plastipak® syringe (BD Medical, USA). In this specific case we detected small polymerized droplets of glue within the syringe and precipitation of glue to the barrel of the syringe.

We have reason to believe that the black plunger head of the syringe instigates a reaction with Histoacryl®. This reaction causes the substance to change its 'state' and initiates polymerization inside the syringe preventing a supple movement of the rubber plunger head within the plastic barrel. The influence of the barrel itself remains unclear. We performed additional testing and encountered this phenomenon with both 1 and 2 ml barrels as well as with polycarbonate and polyethylene barrels from BD Plastipak® (both Luer and Luer lock). The initiation of the polymerization process of Histoacryl® can cause complete blockage within the microcatheter or can even inhibit the progression of the plunger within the barrel of the syringe itself.

We highly recommend neuro-interventionalists using Histoacryl® in the treatment of cerebrovascular lesions to check the influence of the mixture on the behavior of the plunger within the plastic barrel, by leaving the mixture in the syringe for a period of at least five minutes and check the resistance by moving the plunger back and forth.

At present we are using syringes from EV3 (Covidien), Reference number 103-1203, similar to those supplied with the Onyx® embolization kit and have not encountered any problems with early polymerization to date. Moreover, we are now able to prolong the injection time of Histoacryl® significantly with improved intranidal occlusion.

Bob Nieuwenhuizen
Cindy Beerse-Lute
René van den Berg
Interventional Neuroradiology,
Department of Radiology
Academic Medical Center
POBox 9600
1105AZ Amsterdam
The Netherlands

Dr René Van den Berg
Interventional Neuroradiologist
Radiology Department - AMC
Meibergdreef 9
105AZ Amsterdam, The Netherlands
E-mail: r.vdberg@amc.uva.nl